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Safety Criterion for Electrical Apparatus in Hazardous Areas

危险场所电气防爆安全规范

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Safety Criterion for Electrical Apparatus in Hazardous Areas

1 Scope

This standard specifies the safety requirements for selection, installation, use and maintenance as well as inspection procedure of electrical apparatus in explosive gas or combustible dust atmosphere.

This standard is not applicable to the following atmospheres:

——Underground mines;

——Explosive manufacturing and processing sites;

——Treatment rooms.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. For dated reference, subsequent amendments to (excluding correction to), or revisions of, any of these publications do not apply. However, the parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards. For undated references, the latest edition of the normative document referred to applies.

GB 3836.1-2000 Electrical apparatus for explosive gas atmospheres--Part 1: General requirements (eqv IEC 60079-0: 1998)

GB 3836.3-2000 Electrical apparatus for explosive gas atmospheres--Part 3: Increased safety (eqv IEC 60079-7: 1990)

GB 3836.4-2000 Electrical apparatus for explosive gas atmospheres--Part 4: Intrinsic safety (eqv IEC 60079-11: 1999)

GB 3836.5-2004 Electrical apparatus for explosive gas atmosphere Part 5: Pressurized enclosures “p” (MOD IE4 60079-2: 2001)

GB 3836.13-1997 Electrical apparatus for explosive gas atmospheres Part 13: Repair and overhaul for apparatus used in explosive gas atmospheres (eqv IEC 60079-19: 1993)

GB 3836.14-2000 Electrical apparatus for explosive gas atmospheres--Part 14: Classification of hazardous areas (idt IEC 60079-10: 1995)

GB 3836.15-2000 Electrical apparatus for explosive gas atmospheres--Part 15: Electrical installations in hazardous areas (other than mines) (eqv IEC 60079-14: 1996)

GB 12476.1-2000 Electrical apparatus for use in the presence of combustible dust--Part 1-1: Electrical apparatus protected by enclosures and surface temperature limitation--Specification for apparatus (idt IEC 61241-1-1: 1999)

GB 12476.2-2006 Electrical apparatus for use in the presence of combustible dust-Part 1-2: Electrical apparatus protected by enclosures and surface temperature

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limitation-Selection installation and maintenance (idt IEC 61241-1-2: 1999)

GB/T 14823.1-1993 Particular specifications for metal conduits for electrical installations (eqv IEC 60614-2-1: 1982)

GB 16895 Electrical installations of buildings

GB/T 18380.1~18380.3-2001 Tests on electric cables under fire conditions (idt IEC 60332)

GB 50058-1992 Electrical installations design code for explosive atmospheres and fire hazard

IEC 60364 Electrical Installations for Buildings

ISO 4225: 1994 Air quality -- General aspects -- Vocabulary

3 Terms and Definitions

For the purposes of this standard, the following terms and definitions apply.

3.1

Electrical apparatus

It refers to integrity or part of all the apparatus using electrical energy, such as power generation, power transmission, power distribution, power storage, electrical measurement, regulating, inversion and electric apparatus as well as telecommunication apparatus etc.

3.2

Explosive atmosphere

It refers to the atmosphere that the combustion will spead to after the mixture of gas, vapor, mist or dust combustible substance and air is ignited under atmospheric conditions.

3.3

Explosive gas atmosphere

It refers to the atmosphere that the combustion will spead to after the mixture of gas, vapor, mist combustible substance and air is ignited under atmospheric conditions.

3.4

Combustible dust atmosphere

It refers to the atmosphere that the combustion will spead to after the mixture of dust or fibrous combustible substance and air is ignited under atmospheric conditions.

3.5

Hazardous area

It refers to the area that the quantity of explosive gas atmospheres or combustible dust atmospheres is large or the expected quantity is large enough to require special preventive measures for the structure, installation and application of electrical apparatus.。

3.6

Non-hazardous area

It refers to the area that the expected quantity of explosive gas atmospheres or combustible dust atmospheres is not large enough to require special preventive measures for the structure, installation and application of electrical apparatus.

3.7

Normal operation

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It refers to the operation of apparatus that meets the requirements of mechanical and electrical design, and within the limitation specified by the manufacturer.

3.8

Flameproof enclosure

It is a explosionproof type of electrical apparatus, this kind of enclosure can withstand the explosion of combustible mixture which permeates into the enclosure through any joint face or structure clearance of the enclosure, but not be damaged, and will not cause the ignition of the explosive atmosphere formed by a kind of or various kinds of gases or vapors.

Note: generally, the explosionproof type of flameproof enclosure is referred to as flameproof, which is represented by letter "d".

3.9

Increased safety “e”

It is an explosionproof type of measure which is further taken to the electrical apparatus without generating electric arc or spark under normal operation conditions, to improve the safety degree of the electrical apparatus and to prevent it from generating hazardous temperature, electric arc and spark.

3.10

Intrinsically safe electrical apparatus “i”

It refers to the kind of electrical apparatus whose circuits inside are intrinsically safe circuits. Intrinsically safe circuits refer to the circuit in which any electrical spark or any thermal effect produced under the conditions specified in this standard (including normal operation and specified fault conditions) is not capable of causing ignition of a given explosive gas atmosphere.

3.11

Pressurized enclosures electrical apparatus “P”

It refers to the kind of electrical apparatus with pressurized enclosures, i.e. this kind of enclosure is able to keep the pressure of the internal gas higher than the atmospheric pressure of external environment, and be able to prevent external explosive mixture from entering.

3.12

Oil-immersion electrical apparatus “o”

It refers to the kind of electrical apparatus which immerses an electrical apparatus or the components of an electrical apparatus in oil or other protection fluids to make the apparatus unable to ignite the explosive mixtures above the liquid level or outside the enclosure.

3.13

Powder filling electrical apparatus “q”

It refers to the kind of electrical apparatus with the enclosure filled with sand particles or other filler materials to make the electric arc generated in the enclosure, the spreading flame and the overtemperature of the enclosure wall or the filler material surface fail to ignite the explosive mixtures around.

3.14

Encapsulation electrical apparatus “m”

It refers to the kind of electrical apparatus which encapsulates the whole apparatus or part of it in encapsulation agent to make it fail to ignite the explosive mixtures around under normal operation and the approved overload or fault.

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3.15

Non-sparking electrical apparatus “n”

It refers to the kind of electrical apparatus which will not generate the maximum surface temperature that causes ignited spark or exceeds the temperature group limit under normal operation or the abnormal conditions specified by the manufacturer.

3.16

Maintenance

It refers to the comprehensive activities that keep products in or restore to the state meeting the requirements of relevant technical specifications, and realize the required functions of the products.

3.17

Inspection

It refers to the detailed inspection which is carried out to acquire the conclusion of safety and reliability of apparatus operation, based on not dismantling or partially dismantling apparatus, and supplemented by some test measures.

3.17.1

Visual inspection

It refers to the inspection to identify obvious defects (such as bolt missing) with naked eye instead of testing equipment or tools.

3.17.2

Close inspection

It includes visual inspection and the inspection that the obvious defects can only be identified with testing equipments such as stepladder (where necessary) and tools.

Note: Generally, it is not required to open enclosure or cut the power in close inspection.

3.17.3

Detailed inspection

It includes close inspection and the inspection that the obvious defects can only be identified with testing equipments such as stepladder (where necessary) and tools and/or (if necessary) when the enclosure is open.

3.17.4

Initial inspection

It refers to the inspection prior to the operation of all the electrical apparatus, systems and devices.

3.17.5

Periodic inspection

It refers to the routine inspection carried out for all the electrical apparatus, systems and devices.

3.17.6

Continuous supervision

It refers to the constant maintenance, inspection, management, monitoring and maintenance carried out for electrical apparatus by experienced technicians who are experienced in installation and the service environment, to keep the explosionproof performance of the apparatus in a favorable state.

3.18

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